COLUMN:

The art of working cleanly

Controlling the flow of air in a cleanroom environment: All good things come from above?

In this issue, I'd like to describe to you, dear microPRODUCTION readers, an event from my practical experience. The following example focuses on a minienvironment concept to be created on a customer's premises according to the existing machine. In projects such as this one, attention must be paid to the filter technology to be used on the one hand, and particularly to the air flow control on the other. Essentially, the filtered ›primary air‹ should flow around and through the product and the process room. Only then should there be an air flow around the machine elements capable of releasing contamination into the environment in question.

Based on a task definition, we developed a mini-environment concept that uses the process machine's conditions to optimally route the air flow. The air flow was optimally routed through the use of a granite table and a granite portal placed on top. The concept was based on a horizontal, low-turbulence displacement flow, resulting in a relatively unobstructed free cross-section through which the air of a fan-filter-module could flow over the process location.

Particles released by the process were to be removed along non-critical areas. All the process-specific components were attached to the granite portal and were only used during individual process steps in the product area. A vertical flow was considered unfavourable due to the control structure with the process-specific components, since the obstruction of the air flow was so severe that not enough clean air was available at the process location to protect the product area. In addition, the process-specific components would have been located exactly between the fan-filter-module's filter and the process location, so particles released there could have been transported directly to the product.

> » Does the air used in cleanrooms and clean work areas actually always have to come from above? «

Up until that point, everything sounds mostly logical and easy to implement. The realistic goal was to achieve ›an ISO 5 air cleanliness class at least‹ at the process location. While the project team had agreed to the concept, this company's managing director rejected it ›because, the air in the cleanroom must always come from above‹. A horizontal flow hadn't been considered there yet. At this point, I'm unable to say what result was ultimately achieved in this situation, since implementation was assigned to another service provider that met the client's requests ›no questions asked‹. ■

CAREFULLY DETERMINING FLOW CONTROL

A 'horizontal flow' is when the low-turbulence air flow is generated by a vertical fan-filter-module, travels horizontally through the process room and leaves the room again on the opposite side. This principle is suitable if a vertical air flow is disrupted by the machine's components such that an optimum flow around the product and the process is not possible, or contamination from the components can enter the process. With the vertical flow, the air flows vertically through the process room and shouldn't be obstructed by the machine's components either.

> THE AUTHOR

Joachim Ludwig is the Founder and Managing Director of Colandis GmbH based in Kahla/Germany and a lecturer in Cleanroom Technology at the West Saxon University of Applied Sciences in Zwickau. In this issue, he devotes his energies to discussing a specific topic and invites readers to reflect and re-examine their mindsets.

info@colandis.com

Figure: Colandis